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QUALITATIVE PROPERTIES OF DIFFERENTIAL EQUATIONS.(U)
OCT 76 H A ANTOSIEWICZ, W A HARRIS DAHC04-74-G-0013

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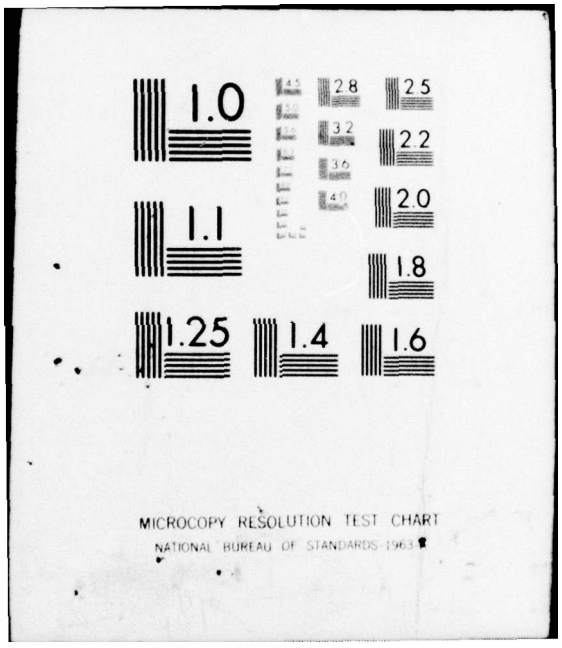
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QUALITATIVE PROPERTIES

OF

DIFFERENTIAL EQUATIONS

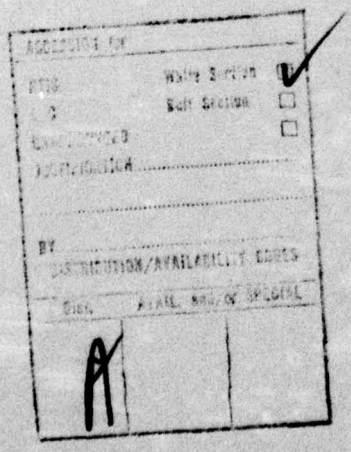
FINAL REPORT

H. A. ANTOSIEWICZ

W. A. HARRIS, JR.

R. J. SACKER

28 OCTOBER 1976



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UNIVERSITY OF SOUTHERN CALIFORNIA

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QUALITATIVE PROPERTIES OF ORDINARY DIFFERENTIAL EQUATIONS

FINAL REPORT

H. A. Antosiewicz, W. A. Harris, Jr., R.J. Sacker

The research carried out by H. A. Antosiewicz was principally concerned with the development of a unified approach to the existence theory for generalized differential equations in a setting that would apply equally to problems arising in mathematical control theory and to general boundary value problems. In particular, his work was centered on establishing very general continuous selection theorems for multivalued functions from which the existence of solutions can be deduced by use of classical fixed point theorems. The results obtained hold for the general non-convex case and include as special cases most earlier results for the convex case.

W. A. Harris, Jr. carried out a broad research program on (1) singular perturbation problems; (2) behavior of solutions of linear and non linear systems of difference equations near fixed singular points; (3) asymptotic integration of linear differential systems. For example: (1) The versatility and applicability of differential inequalities to singular perturbation problems has been demonstrated; (2) A new approach to establishing the asymptotic nature of formal solutions to systems of difference equations has been employed to treat an "open problem"; and (3) A unified approach to asymptotic integration has been developed through the reduction to L-diagonal form.

R. J. Sacker has, together with George Sell, pursued a broad line of investigation into the properties of skew-product dynamical systems which includes time varying ordinary differential equations, mapping of manifolds and Functional Differential Equations. For the nonlinear case results have been obtained which guarantee almost periodic solutions. New results are obtained and the survey article "Lifting Properties---" brings into focus the work of other authors in this area. For linear systems conditions are given which guarantee the exponential dichotomy and the trichotomy. A spectral theory has been developed which generalizes the concept of eigenvalues and includes the Lyapunov type number theory.

List of publications published under ARO-D Sponsorship during the period 15 September 1973-15 September 1976:

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